Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Claim 1 (currently amended): A ~~multiple compression coding~~ method for operating a coding apparatus comprising at least a first coder and a second coder, a processor unit, and a processor unit memory, comprising:

providing a multiple compression coding via a plurality of coding techniques by the first coder and the second coder;

feeding an input signal in parallel to at least the first and second coder, each coder comprising a succession of functional units for compression coding of said input signal by each of the first and second coders, the first and second coders respectively comprising at least a first and a second functional unit for performing common operations;

calculating, by at least a part of the functional units with the processor unit, respective parameters for coding of the input signal by each coder;

performing calculations for delivering a same set of parameters to the first functional unit and to the second functional unit in a same step and in a same functional unit; [[and]]

if at least one of the first and the second coder operates at a rate that is different from a rate of a common functional unit, adapting the parameters to the respective rate of at least one respective said first coder and said second coder in order to be used by the at least one of said first and second functional unit respectively; and

if the first and the second coders operate at a rate that is the same as a rate of a common functional unit, then providing the parameters to the first and second functional units without adaptation.

Claim 2 (previously presented): A method according to claim 1, wherein the common functional unit comprises at least one of the function units of one of the first and second coders .

Claim 3 (previously presented): A method according to claim 28, wherein, for each function executed in the executing step , at least one functional unit is used of a coder selected from said plurality of coders and the functional unit of said coder selected is adapted to deliver partial results to the other coders, for efficient coding by said other coders verifying an optimum criterion between complexity and coding quality.

Claim 4 (previously presented): A method according to claim 3, the coders being liable to operate at respective different bit rates, wherein the selected coder is the coder with the lowest bit rate and the results obtained after execution of the function in the executing step with parameters specific to the selected coder are adapted to the bit rates of at least some of the other coders by a focused parameter search for at least some of the other modes up to the coder with the highest bit rate.

Claim 5 (previously presented): A method according to claim 3, the coders being adapted to operate at respective different bit rates, wherein the coder selected is the coder with the highest bit rate and the results obtained after execution of the function in the executing step with parameters specific to the selected coder are adapted to the bit rates of at least some of the other coders by a focused parameter search for at least some of the other modes up to the coder with the lowest bit rate.

Claim 6 (previously presented): A method according to claim 4, wherein the functional unit of a coder operating at a given bit rate is used as the calculation module for that bit rate and at least some of the parameters specific to that coder are progressively adapted:

· up to the coder with the highest bit rate by focused searching; and

· up to the coder with the lowest bit rate by focused searching.

Claim 7 (previously presented): A method according to claim 1, wherein the functional units of the various coders are arranged in a trellis with a plurality of possible paths in the trellis, wherein each path in the trellis is defined by a combination of operating modes of the functional units and each functional unit feeds a plurality of possible variants of the next functional unit.

Claim 8 (previously presented): A method according to claim 7, wherein a partial selection module is provided after each coding step conducted by one or more functional units capable of selecting the results supplied by one or more of those functional units for subsequent coding steps.

Claim 9 (previously presented): A method according to claim 7, the functional units being liable to operate at respective different bit rates using respective parameters specific to said bit rates, wherein, for a given functional unit, the path selected in the trellis is that passing through the lowest bit rate functional unit and the results obtained from said lowest bit rate functional unit are adapted to the bit rates of at least some of the other functional units by a focused parameter search for at least some of the other functional units up to the highest bit rate functional unit.

Claim 10 (previously presented): A method according to claim 7, the functional units being liable to operate at respective different bit rates using respective parameters specific to said bit rates, wherein, for a given functional unit, the path selected in the trellis is that passing through the highest bit rate functional unit and the results obtained from said highest bit rate functional unit are adapted to the bit rates of at least some of the other functional units by a focused parameter search for at least some of the other functional units up to the lowest bit rate functional unit.

Claim 11 (previously presented): A method according to claim 10, wherein, for a given bit rate associated with the parameters of a functional unit of a coder, the functional unit operating at said given bit rate is used as the calculation module and at least some of the parameters specific to that functional unit are progressively adapted:

· up to the functional unit capable of operating at the lowest bit rate by focused searching; and

· up to the functional unit capable of operating at the highest bit rate by focused searching.

Claim 12 (previously presented): A method according to claim 28, wherein said calculation module is independent of said coders and is adapted to redistribute results obtained in the executing step to all the coders.

Claim 13 (currently amended): A method according to claim 12, ~~further comprising:~~

~~identifying the functional units forming each coder and one or more functions implemented by each unit;~~

~~marking functions that are common from one coder to another; and~~

~~executing said common functions in a common calculation module;~~

wherein the independent module and the functional unit or units of at least one of the coders are adapted to exchange results obtained in the executing step with each other and the calculation module is adapted to effect adaptation transcoding between functional units of different coders.

Claim 14 (previously presented): A method according to claim 12, wherein the independent module includes a functional unit for performing operations of a coding process and an adaptation transcoding functional unit.

Claim 15 (previously presented): A method according to claim 1, wherein the coders in parallel are adapted to operate multimode coding and an a posteriori selection module is provided capable of selecting one of the coders.

Claim 16 (previously presented): A method according to claim 15, wherein a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units.

Claim 17 (previously presented): A method according to claim 1, wherein the coders are of the transform type and the calculation module includes a bit assignment functional unit shared between all the coders, each bit assignment effected for one coder being followed by an adaptation to that coder, in particular as a function of its bit rate.

Claim 18 (previously presented): A method according to claim 17, wherein the method further includes a quantization step the results whereof are supplied to all the coders.

Claim 19 (previously presented): A method according to claim 18, wherein it further includes steps common to all the coders including:

· a time-frequency transform;

· detection of voicing in the input signal;

· detection of tonality;

· determination of a masking curve; and

· spectral envelope coding.

Claim 20 (previously presented): A method according to claim 17, wherein the coders effect sub-band and the method further includes steps common to all the coders including:

· application of a bank of analysis filters;

· determination of scaling factors;

· spectral transform calculation; and

· determination of masking thresholds in accordance with a psycho-acoustic model.

Claim 21 (previously presented): A method according to claim 1, wherein the coders are of the analysis by synthesis type and the method includes steps common to all the coders including:

· preprocessing;

· linear prediction coefficient analysis;

· weighted input signal calculation; and

· quantization for at least some of the parameters.

Claim 22 (currently amended): A method according to claim 21, wherein:

the coders in parallel are adapted to operate multimode coding and an a posteriori

~~*a posteriori*~~ selection module is provided capable of selecting one of the coders;

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units; and

the partial selection module is used after a split vector quantization step for short-term parameters.

Claim 23 (currently amended): A method according to claim 21, wherein:

the coders in parallel are adapted to operate multimode coding and an a posteriori

~~*a posteriori*~~ selection module is provided capable of selecting one of the coders;

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units; and

the partial selection module is used after a shared open loop long-term parameter search step.

Claim 24 (currently amended): A computer program product, comprising:

a computer readable medium storing a computer program product in memory, said computer readable medium including instructions for implementing a multiple compression coding method for operating a coding apparatus comprising at least a first coder and a second coder that both utilize a plurality of coding techniques, the apparatus being fed with an input signal, said input signal being inputted in parallel to at least the first and second coders, each of the first and second coders comprising a succession of functional units, for compression coding of the input signal by each of the first and second coders,

at least a part of said functional units performing calculations for delivering respective parameters for the coding of the input signal by each coder,

the first and second coders respectively comprising at least a first and a second functional unit arranged for performing common operations,

wherein

calculations for delivering a same set of parameters to the first functional unit and to the second functional unit are performed in a same step and in a same functional unit, [[and]]

if ~~in case~~ at least one of the first and the second coder operates at a rate which is different from the rate of said common functional unit, the parameters are adapted to the rate of the respective at least one of the first and second coder in order to be used by the at least one of the respective first and second functional unit; and

if the first and the second coders operate at a rate that is the same as a rate of a common functional unit, then the parameters are provided to the first and second functional units without adaptation.

Claim 25 (currently amended): A system for assisting multiple compression coding, comprising:

a multiple compression coding apparatus comprising:

at least a first coder and a second coder, the apparatus being fed with an input signal, said input signal being inputted in parallel to at least the first and the second coders, each of the first and second coders comprising a succession of functional units, for compression coding via a plurality of coding techniques of the input signal by each of the first and second coders,

at least a part of said functional units performing calculations for delivering respective parameters for the coding of the input signal by each coder,

the first and second coders respectively comprising at least a first and a second functional unit arranged for performing common operations,

wherein

calculations for delivering a same set of parameters to the first functional unit and to the second functional unit are performed in a same step and in a same functional unit, and

if ~~in case~~ at least one of the first and the second coder operates at a rate which is different from the rate of said common functional unit, the parameters are adapted to the rate of the respective at least one of the first and second coder in order to be used by the respective at least one of the first and second functional unit, respectively; and

if the first and the second coders operate at a rate that is the same as a rate of a common functional unit, then the parameters are provided to the first and second functional units without adaptation.

Claim 26 (previously presented): A system according to claim 25, wherein it further includes an independent calculation module for implementing the following preparatory steps:

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are common from one coder to another; and

executing said common functions in a common calculation module.

Claim 27 (currently amended): A multiple compression coding method, comprising:

providing a multiple compression coding via a plurality of coding techniques by a plurality of coders comprising at least a first coder and a second coder;

feeding an input signal in parallel to an apparatus comprising the [[a]] plurality of coders, each including a succession of functional units for compression coding of said signal by each coder, wherein each coder comprises a different combination of functional units;

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are equivalent from one coder to another;

selecting a function executed by a given coder amongst the functions that are equivalent, and executing, via a processor unit, said functions with parameters related to the given coder only one time for the input signal for at least some of the coders in a common calculation module;

adapting a result obtained from the execution of the function in the selecting and executing step for a use in at least a part of the plurality of coders; and

producing and feeding a coded output signal from the apparatus based at least in part on the common functions.

Claim 28 (previously presented): A method according to claim 1, further comprising:

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are common from one coder to another; and

executing said common functions in a common calculation module.

Claim 29 (currently amended): A multiple compression coding method, comprising:

feeding an input signal in parallel to an apparatus comprising a plurality of coders, each including a succession of functional units for compression coding of said signal by each coder, wherein each coder comprises a different combination of functional units;

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are common from one coder to another;

executing, via a processor unit, said common functions only one time for the input signal for at least some of the coders in a common calculation module; and

producing and feeding a coded output signal from the apparatus based at least in part on the common functions;

wherein

said calculation module is independent of said coders and is adapted to redistribute results obtained in the executing step to all the coders; and

the independent module and the functional unit or units of at least one of the coders are adapted to exchange results obtained in the executing step with each other and the calculation module is adapted to effect adaptation transcoding between functional units of different coders.